

ASSOCIATION BETWEEN STAPHYLOCOCCUS AUREUS IN THE HOME ENVIRONMENT AND DECREASED LUNG FUNCTION IN ASTHMATIC CHILDREN IN BARBADOS

Meghan F. Davis, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland USA

D'Ann Williams, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland USA

Selvi Jeyaseelan, The University of the West Indies, Cavehill, Barbados WI

Ian Hambleton, Chronic Disease Research Centre, Tropical Medicine Research Institute, The University of the West Indies, Cavehill, Barbados WI

Angela Jennings, School of Clinical Medicine and Research, The University of the West Indies, Queen Elizabeth Hospital, Bridgetown, Barbados WI

Lance B. Price, Division of Pathogen Genomics, The Translational Genomics Research Institute, Flagstaff, Arizona USA

Patrick Breysse, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland USA

Greg Diette, Johns Hopkins School of Medicine, Baltimore, Maryland USA

Meredith McCormack, Johns Hopkins School of Medicine, Baltimore, Maryland USA

Background and Aims. *Staphylococcus aureus*, a gram-positive bacterium, can survive in the environment for weeks to months. While asthma is a known risk factor for nasal colonization with methicillin-resistant *Staphylococcus aureus* (MRSA), less is understood about potential associations between *S. aureus* environmental exposure and asthma symptoms. We adapted culture methods for MRSA and methicillin-susceptible *S. aureus* (MSSA) to the household setting and estimated associations between measures of lung function in asthmatic children and household *S. aureus* environmental positivity.

Methods. We sampled surface dust from a subgroup of 19 children enrolled in a pilot childhood asthma study in Barbados during July 2010. Children and their families recorded twice-daily FEV₁ measures using a personal PIKO instrument for five days. Concurrently, we sampled a common room surface and the child's pillow in each home using sterilized dry electrostatic cloths, which we cultured using single-enrichment (MSSA) and double-enrichment (MRSA) protocols. We confirmed suspect *S. aureus* colonies by real-time PCR methods for *femA* (MSSA), and *mecA* (MRSA) gene presence.

Results. Eight of 19 households (42%) were positive for MSSA (4) or MRSA (4). Pillows were the location most often positive (7 of 8 households). Average child age was 11 years (range: 6-17). Mean FEV₁ was 1.60 [95%CI: 1.15-2.06], accounting for within-child correlation. *S. aureus* household positivity was associated with a 0.43 unit decrease in log FEV₁ measures in asthmatic children, controlling for within-child correlation of measurements over time ($p=0.02$). Age was a significant confounder and attenuated the estimate to a 0.20 unit decrease ($p=0.07$).

Conclusions. Among children with asthma in Barbados, *S. aureus* in the home environment was associated with lower lung function. While this study did not assess *S. aureus* nasal colonization in asthmatic children, future research using a larger cohort to investigate the link between *S. aureus* exposure and asthma outcomes is warranted.